

## REMARKS

### **I. Status of the Application**

Claims 1-11 are pending in the application. Claims 4 and 8 stand objected to, but are now in condition for allowance as discussed below. Claims 1-3, 5-7, and 9-11 stand rejected under 35 U.S.C. § 102(b) over US 5,725,491 ("Tipton"). Applicants respectfully traverse this sole rejection in view of the following remarks.

Applicants are presenting new claims 12-20 of which claims 12, 15, and 18-19 are independent claims. Claims 12, 15, and 18-19 each define, in part, NMP present in an amount between 0.05 and 50 weight- %. Support for new claims 12-20 is found throughout the specification, for example, at page 9, paragraph 39 where Applicants disclose, "The NMP content is preferably between 0.05 and 50 weight- %, more preferably between 0.1 and 10 weight-%." New claims 12-20 are in condition for allowance, as discussed in detail immediately below.

### **II. Claims 4, 8 and 12-20 Are In Condition for Allowance**

Applicants thank the Examiner for the indication at page 3 of the present Office Action that claims 4 and 8, if rewritten as independent claims including all features of their respective base claim, would be in condition for allowance. As such, claims 4 and 8 are presented above in accordance with the Examiner's suggestion and allowance of claims 4 and 8 is respectfully requested at this time.

In view of the Examiner's indication, it is understood that none of the references presently cited disclose, either explicitly or inherently, the feature of originally presented claims 4 and 8, i.e., NMP being present in an amount between 0.05 and 50 weight- %. It is noted that

originally presented claims 4 and 8 were patentable over the presently cited references before the foregoing amendment to claims 4 and 8. Accordingly, claims 4 and 8 are not being amended for patentability, but rather for form.

New claims 12-20 are also patentable over the presently cited references because each claim defines in part either directly or indirectly, NMP being present in an amount between 0.05 and 50 weight- %. Accordingly, new claims 12-20 are in condition for allowance for at least the same reasons that claims 4 and 8 are allowable. Thus, allowance of new claims 12-20 is respectfully requested at this time.

### **III. The Examiner's Request for Claims of Companion Case**

The Examiner presently requests at page 2 of the present Office Action that Applicants forward a copy of the claims in copending US Application No. 10/006,796. Applicants are accordingly attaching herewith a copy of the requested claims as filed at Tab A.

### **IV. Claims 1-3, 5-7, and 9-11 Are Patentable over Tipton**

Claims 1-3, 5-7, and 9-11 stand rejected under 35 U.S.C. § 102(b) over Tipton. Applicants respectfully traverse this rejection.

Independent claim 1 is patentable over Tipton at least because Tipton fails to disclose, either explicitly or inherently, NMP present in an amount imparting osteogenic properties for the composition. Applicants teach, for example at page 3, paragraph 21, the significance of the amount of NMP in the present composition:

The present invention relates to a combination of N-methyl-2-pyrrolidone (NMP) and resorbable polymers or copolymers. The invention is based on the unexpected realization that by combining a resorbable matrix material and NMP in a certain ratio, an implant having osteogenic properties is achieved.

In contrast, Tipton teaches at column 3, lines 20-28, that bone growth is actually attributed to a biological agent added to the liquid composition containing the polymer and the solvent:

The liquid composition can further contain at least one biologically active agent which provides a biological, physiological or therapeutic effect in a human or animal. The biologically active agent is incorporated in the film dressing and is subsequently released into the surrounding tissue. The biological agent can act to enhance cell growth and tissue regeneration, cause nerve stimulation or bone growth, prevent infections, promote wound healing and/or provide pain relief.

Nowhere does Tipton disclose that NMP is present in an amount imparting osteogenic properties for the composition. As such, claim 1 and all claims dependent therefrom are patentable over Tipton for at least this reason.

Claim 1 is additionally patentable over Tipton because Tipton fails to disclose, either explicitly or inherently, a base material including a polymer matrix of a resorbable polymer or copolymer, and N-methyl-2-pyrrolidone (NMP). In that regard, claim 5 is patentable over Tipton for at least this reason as well, as independent claims 1 and 5 each define a base material including a polymer matrix of a resorbable polymer or copolymer, and N-methyl-2-pyrrolidone (NMP). Applicants explain at page 9, paragraph 39-40 how the polymer matrix of resorbable polymer or copolymer, and N-methyl-2-pyrrolidone (NMP) interact:

Resorbable polymer matrix absorbs NMP when immersed into it. Thereafter, an implant loaded with NMP is implanted into the body, and is released gradually during a certain period of time. If the rate of releasing is appropriate, NMP owns osteogenic properties.

According to one preferred embodiment of the method of the present invention, NMP is mixed with a polymer matrix or one of its components before the polymer matrix is fashioned into the form of a medical implant.

It is apparent from Applicants' disclosure that the polymer matrix does not dissolve in NMP when the polymer matrix is combined with NMP. Rather, the polymer matrix *absorbs* NMP, and

the resulting NMP-infused polymer matrix is, in certain preferred embodiments, fashioned into an implant. Thus, the polymer matrix and NMP co-exist.

In contrast, Tipton discloses a biodegradable polymer in a solvent, wherein the resulting combination of the polymer and the solvent does not form a polymer matrix. Indeed, Tipton teaches throughout the disclosure, for example at column 5, lines 7-15, that the polymer does not form a matrix until the solvent is evaporated:

The thermoplastic polymers are substantially insoluble in aqueous or body fluids, but are capable of dissolving or dispersing in a water miscible carrier or solvent to form a solution or dispersion. Upon dissipation of the solvent component and contact with an aqueous based fluid, the thermoplastic polymers are capable of coagulating or solidifying to form a solid or gelatinous matrix suitable for use as the film dressing.

Tipton makes it abundantly clear at column 5, lines 59-66 that that the polymer matrix and the solvent do not co-exist:

According to the invention, the liquid composition is administered to a tissue site, whereupon the solvent dissipates. Upon contact with the surrounding aqueous fluids, the polymer moiety coagulates or solidifies to form a solid or gelatinous matrix for use as a film at the tissue site. The solvent can evaporate or quickly diffuse into the surrounding tissue fluids or aqueous-based fluids to enhance formation of the polymer matrix following administration of the composition to the tissue site.

Since it is not until the solvent dissipates that a polymer matrix is formed, the polymer matrix of Tipton does not co-exist with the solvent, as does the polymer matrix of Applicants. As such, Tipton fails to disclose the combination of a base material including a polymer matrix of a resorbable polymer or copolymer, and N-methyl-2-pyrrolidone (NMP). Thus, independent claims 1 and 5 are patentable over Tipton for at least this reason.

In that regard, independent method claim 9 is patentable over Tipton because Tipton fails to disclose forming the implant from the mixture of the polymer matrix and NMP. As discussed above, when the polymer matrix of Applicants is combined with NMP, the polymer matrix and

the NMP co-exist. In contrast, Tipton teaches that a polymer matrix is not formed until after the solvent dissipates. In accordance with the disclosure of Tipton then, one cannot form an implant from a mixture of polymer matrix and solvent, as the polymer matrix is not formed until after the solvent dissipates. As Tipton fails to disclose forming the implant from the mixture of the polymer matrix and NMP, claim 9 is patentable over Tipton for at least this reason.

Further, independent method claim 10 is patentable over Tipton because Tipton does not disclose mixing the polymer(s) or copolymer(s) to form the polymer matrix, as defined by claim 10. As discussed above, the Tipton polymer matrix is not formed until the polymer is mixed with a solvent and the solvent dissipates from the mixture upon administration of the composition to the tissue site. See, for example, column 5, lines 59-66 (quoted above). Thus, Tipton does not disclose mixing polymer(s) or copolymer(s) to form the polymer matrix, as defined by claim 10. Accordingly, claim 10 (and dependent claim 11) is patentable over Tipton for at least this reason.

Claims 9 and 10 are each additionally patentable over Tipton because Tipton fails to disclose, either explicitly or inherently, adding NMP to the polymer matrix (or the implant) in an amount imparting osteogenic properties for the implant. As discussed above with regard to claim 1, Applicants teach that NMP imparts osteogenic properties to the implant. See, for example, page 3, paragraph 21 (quoted above). Tipton, in contrast, teaches that an additionally added biological agent added to the liquid composition containing the polymer and the solvent actually provides bone growth. Since Tipton does not disclose that NMP is added to the polymer matrix in an amount imparting osteogenic properties for the implant, claims 9 and 10 are patentable for this additional, independently sufficient reason.


Accordingly, in view of the foregoing discussion, Applicants respectfully request removal of the present rejection.

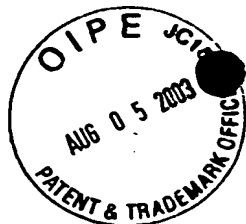
V. Conclusion

Having addressed all outstanding issues, Applicants respectfully request entry and consideration of the foregoing remarks and reconsideration and allowance of all claims at this time. To the extent the Examiner believes that it would facilitate allowance of the case, the Examiner is requested to telephone the undersigned at the number below.

Respectfully submitted,

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CLAIMS

1. A biodegradable implant comprising:  
a matrix component containing at least one biodegradable polymer  
or copolymer, and  
5 a plasticizer that is adapted to reduce substantially the rigidity of the  
implant,  
which plasticizer substantially exits from the implant after coming  
into contact with tissue fluids of the organ system in such a manner that  
the bending resistance of the implant prior to the insertion of the im-  
10 plant into the organ system is substantially lower than after its insertion into the  
organ system.
2. A biodegradable implant comprising:  
a matrix component containing at least one biodegradable polymer  
15 or copolymer, and  
a plasticizer that is adapted to reduce substantially the rigidity of the  
implant,  
which plasticizer substantially comprises N-methyl-2-pyrrolidone  
(NMP),  
20 and which plasticizer substantially exits from the implant after com-  
ing into contact with tissue fluids of the organ system in such a manner that  
the bending resistance of the implant prior to the insertion of the im-  
plant into the organ system is substantially lower than after its insertion into the  
organ system.
- 25 3. An implant as claimed in claim 1, wherein the matrix compo-  
nent comprises at least one of the following polymers or copolymers that is  
selected from the following group: polyglycolide, polylactides, polycaprolac-  
tones, polytrimethylenecarbonates, polyhydroxybutyrates, polyhydroxyvaler-  
30 ates, polydioxanones, polyorthoesters, polycarbonates, polytyrosinecarbon-  
ates, polyorthocarbonates, polyalkylene oxalates, polyalkylene succinates,

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poly(malic acid), poly(maleic anhydride), polypeptides, polydepsipeptides, polyvinylalcohol, polyesteramides, polyamides, polyanhydrides, polyurethanes, polyphosphazenes, polycyanoacrylates, polyfumarates, poly(amino acids), modified polysaccharides, modified proteins and copolymers thereof.

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4. An implant as claimed in claim 1, wherein at least the surface of the implant is porous.

5. An implant as claimed in claim 1, wherein active agents, such as antibiotics, pharmaceutical products, growth hormones, styptic agents, chemotherapy agents, are arranged in the implant.

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6. An implant as claimed in claim 1, wherein the plasticizer is added to the matrix material at the latest at the forming stage of the implant.

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7. An implant as claimed in claim 1, wherein the plasticizer is added to the implant just before the implant is inserted into the organ system.

8. An implant as claimed in claim 1, wherein the implant is a membrane used in guided tissue regeneration.

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9. A method for manufacturing a biodegradable implant comprising the steps of:

selecting biodegradable polymer(s) or copolymer(s) of a matrix component of the implant,

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adding a plasticizer to the matrix component,

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which plasticizer substantially exits from the implant after coming into contact with tissue fluids of the organ system in such a manner that the rigidity of the implant increases substantially after the implant is inserted into the organ system, and

forming the implant from the mixture of said matrix component and plasticizer.

10. A method for manufacturing a biodegradable implant comprising the steps of:

5       selecting biodegradable polymer(s) or copolymer(s) of a matrix component of the implant,  
      forming the implant from said matrix component, and  
      adding a plasticizer to the matrix component,  
      which plasticizer substantially exits from the implant after coming  
10   into contact with tissue fluids of the organ system in such a manner that the rigidity of the implant increases substantially after the implant is inserted into the organ system.

11. A method as claimed in claim 9, wherein the plasticizer comprises N-methyl-2-pyrrolidone (NMP).

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12. A method as claimed in claim 9, wherein the plasticizer is added to the implant just before the implant is inserted into the organ system.

13. A method as claimed in claim 9, wherein the matrix component  
20   comprises at least one of the following polymers or copolymers that is selected from the following group: polyglycolide, polylactides, polycaprolactones, polytrimethylenecarbonates, polyhydroxybutyrates, polyhydroxyvalerates, polydioxanones, polyorthoesters, polycarbonates, polytyrosinecarbonates, polyorthocarbonates, polyalkylene oxalates, polyalkylene succinates, poly(malic acid),  
25   poly(maleic anhydride), polypeptides, polydepsipeptides, polyvinylalcohol, polyesteramides, polyamides, polyanhydrides, polyurethanes, polyphosphazenes, polycyanoacrylates, polyfumarates, poly(amino acids), modified polysaccharides, modified proteins and copolymers thereof.

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14. A method as claimed in claim 9, wherein the implant is porous.

15. A method as claimed in claim 9, wherein active agents are added to the implant.

16. A method as claimed in claim 15, wherein the active agents are  
5 first mixed into the plasticizer and then added together with the plasticizer to the matrix component.

17. A method as claimed in claim 9, wherein the implant is a membrane used in guided tissue regeneration.

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